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Ayala et al.

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(54) **PORTABLE WORK BENCH**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 920 days.

This patent is subject to a terminal disclaimer.

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Related U.S. Application Data

(63) Continuation of application No. 12/883,642, filed on Sep. 16, 2010, now Pat. No. 8,167,011, which is a continuation of application No. 12/416,372, filed on Apr. 1, 2009, now Pat. No. 7,814,947, which is a continuation of application No. 11/376,963, filed on

(Continued)

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B23D 47/02 (2006.01)
B25H 1/06 (2006.01)

(52) **U.S. Cl.**
CPC ***B23D 47/025*** (2013.01); ***B25H 1/06*** (2013.01); *Y10S 269/901* (2013.01); *Y10T 83/8763* (2015.04); *Y10T 83/95* (2015.04)

(58) **Field of Classification Search**
CPC B25H 1/0021; B25H 1/04; B25H 1/10; B25H 1/06; B23D 47/02; B23D 47/025; B23D 47/04; B23D 59/00; B23D 59/007; Y10T 83/95; Y10T 83/8763; Y10S 269/901; B27B 5/29
USPC ..... 144/286.1–287; 476/471, 474; 182/181.1, 182.1, 183.1, 186.1; 269/289 R, 291, 901; 83/471, 474
See application file for complete search history.

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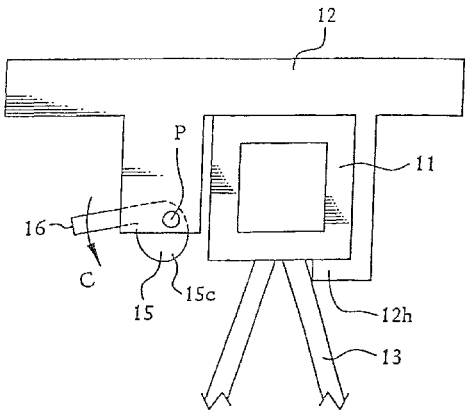
(57) **ABSTRACT**

An improved portable work bench includes a structural body, and a platform disposed on and frictionally contacting the structural body. In addition, the platform includes an override mechanism for allowing horizontal movement of the platform along the structural body. Further, the portable work bench may include a plurality of legs for supporting the structural body. The structural body may be tubular and preferably has a trapezoidal cross-section. Such work bench can be used by disposing the platform on the structural body, so that the platform frictionally contacts the structural body. Then the user can mechanically override the static friction between the platform and the structural body and move the platform horizontally along the structural body.

15 Claims, 9 Drawing Sheets



Related U.S. Application Data

Mar. 16, 2006, now Pat. No. 7,530,377, which is a continuation of application No. 10/835,813, filed on Apr. 30, 2004, now Pat. No. 7,048,021, which is a continuation of application No. 10/449,270, filed on May 30, 2003, now Pat. No. 6,748,987, which is a continuation of application No. 10/151,507, filed on May 20, 2002, now Pat. No. 6,595,251, which is a continuation of application No. 09/760,386, filed on Jan. 12, 2001, now Pat. No. 6,415,831, which is a continuation of application No. 09/357,500, filed on Jul. 20, 1999, now Pat. No. 6,199,608, which is a continuation of application No. 09/207,355, filed on Dec. 8, 1998, now Pat. No. 5,988,243, which is a continuation-in-part of application No. 08/899,937, filed on Jul. 24, 1997, now Pat. No. 5,875,828.

(60) Provisional application No. 60/070,501, filed on Jan. 6, 1998.

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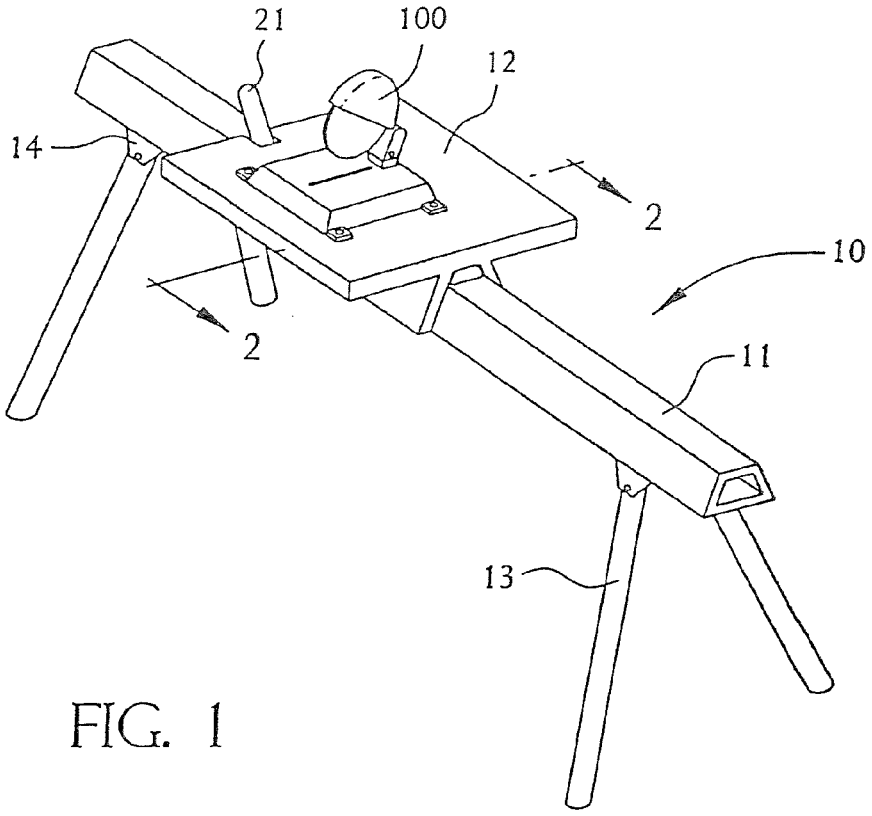

FIG. 1

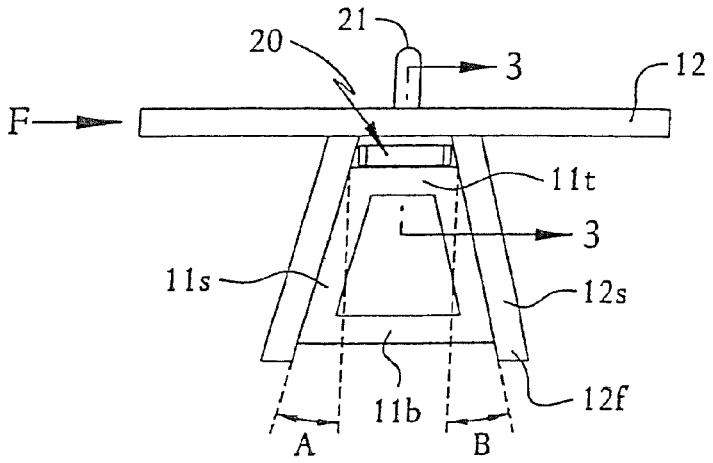

FIG. 2

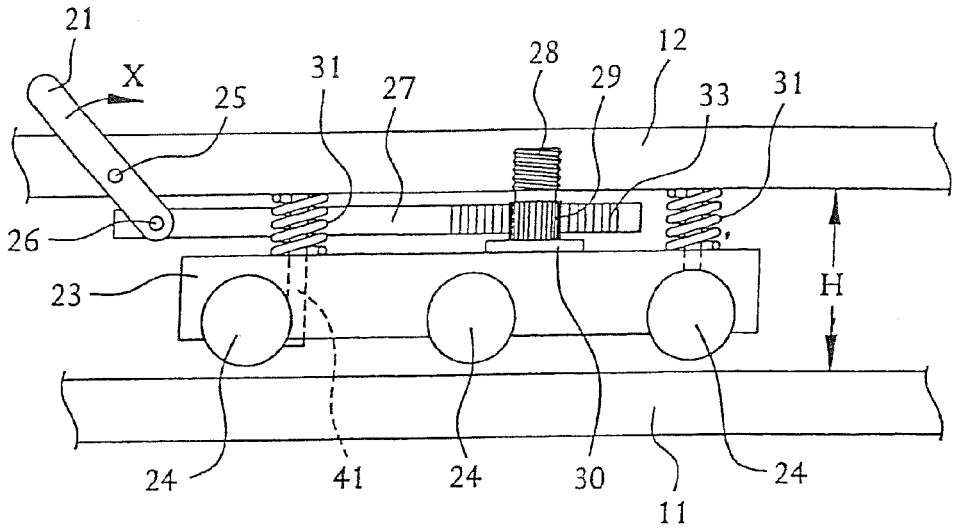

FIG. 3A

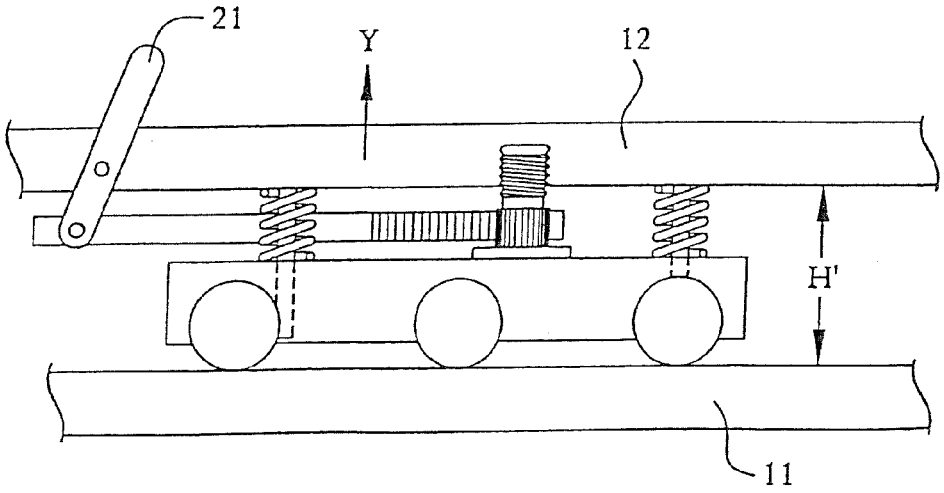

FIG. 3B

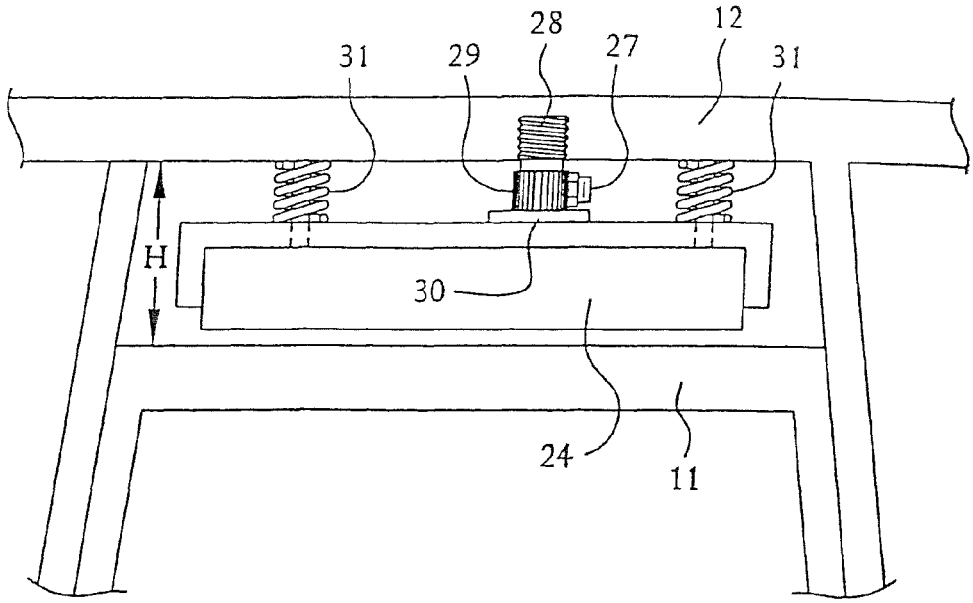

FIG. 4A

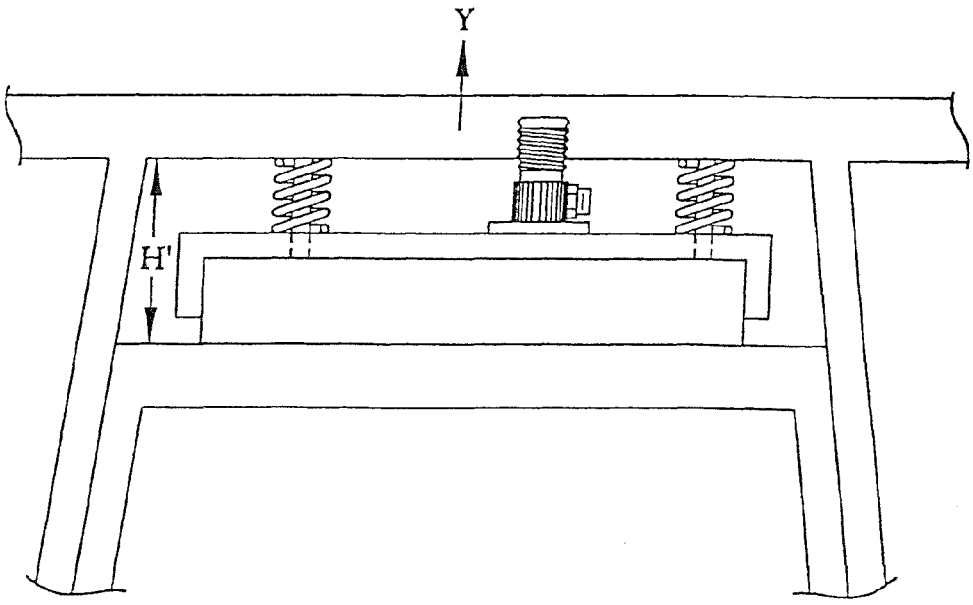

FIG. 4B

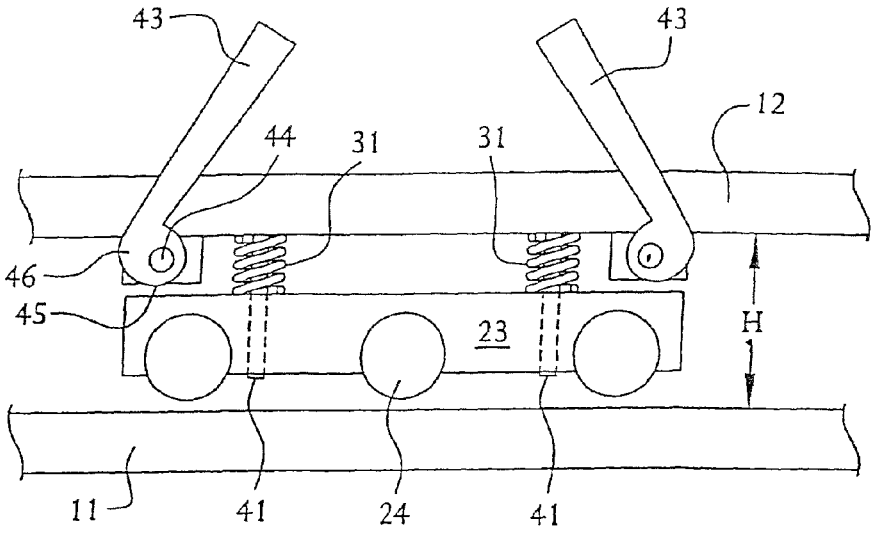

FIG. 5A

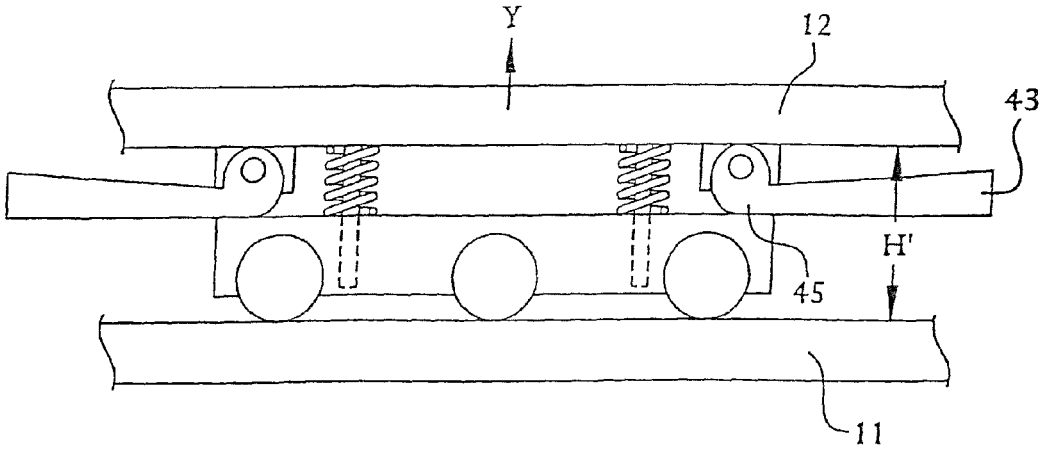

FIG. 5B

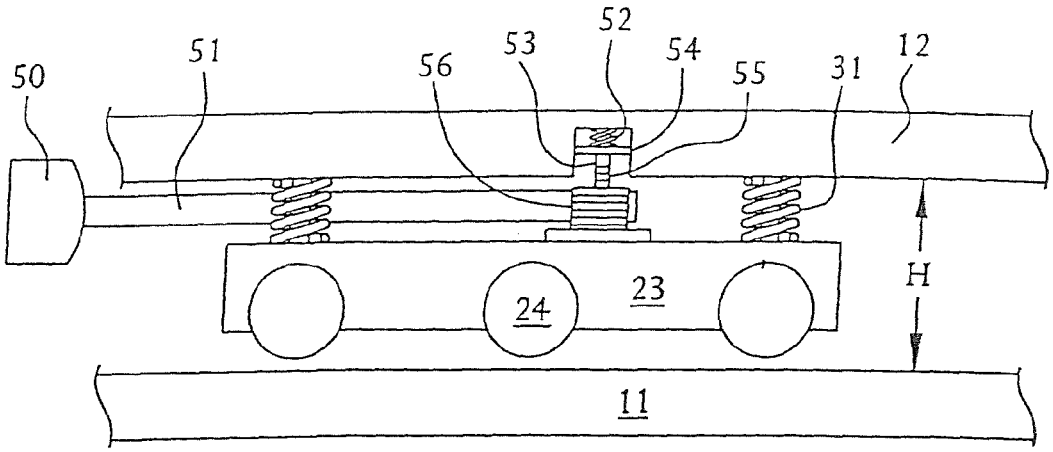

FIG. 6A

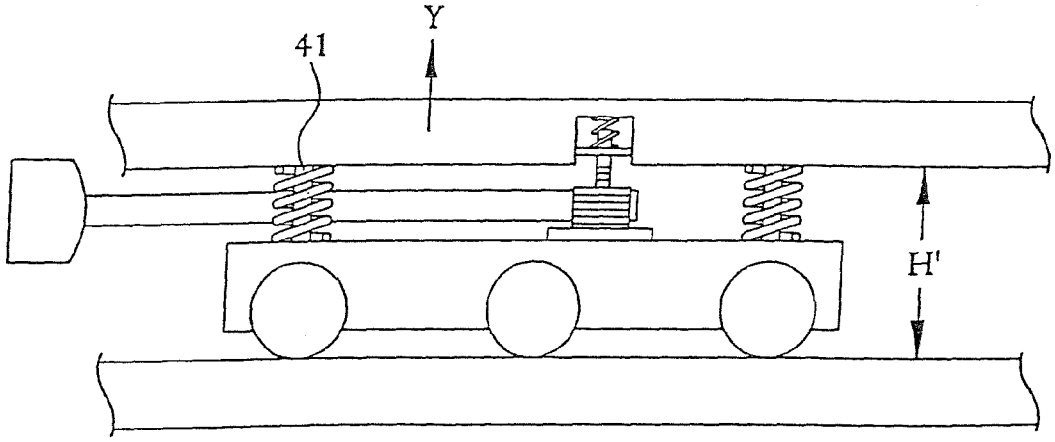

FIG. 6B

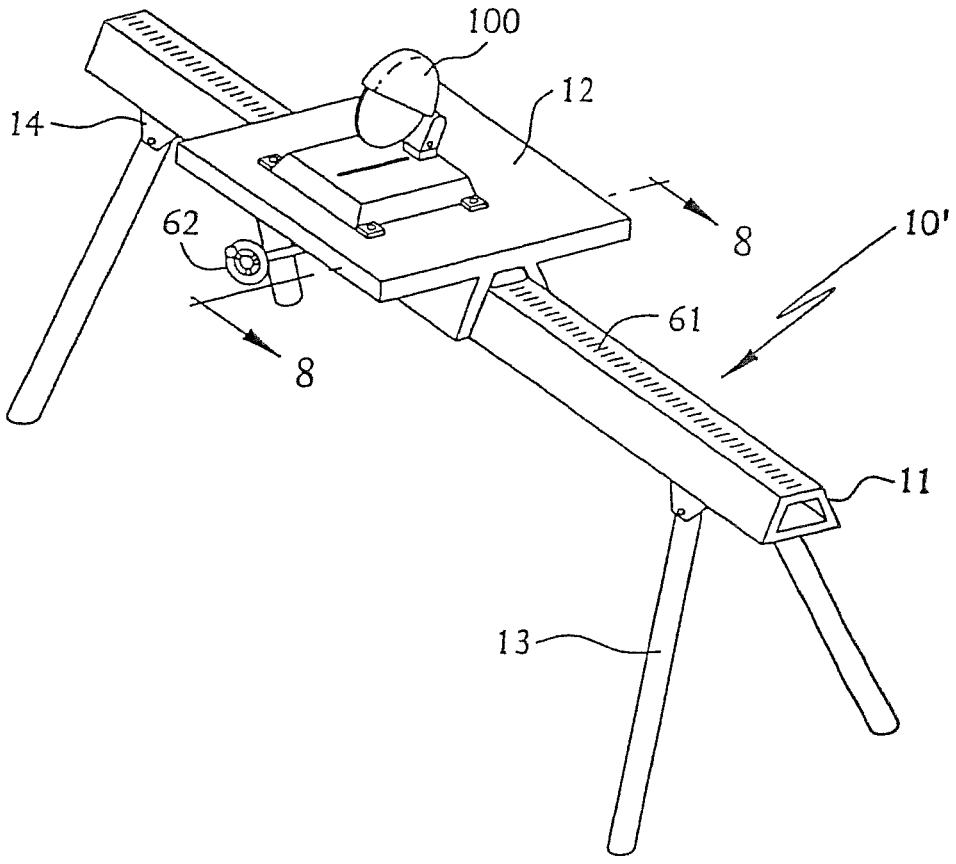

FIG. 7

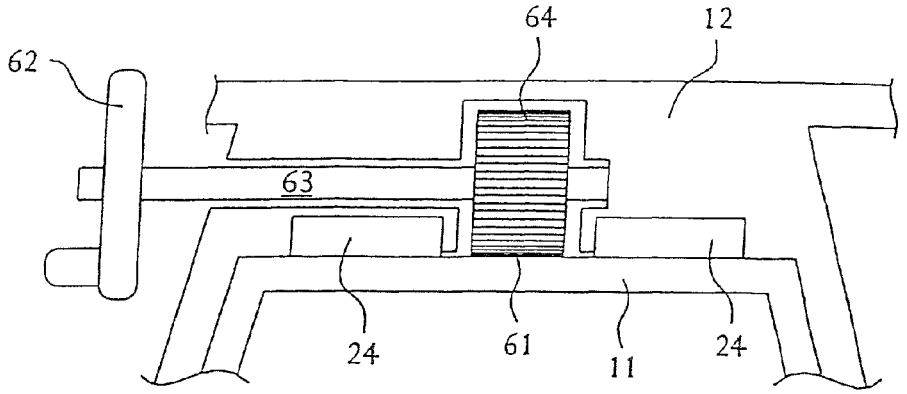

FIG. 8

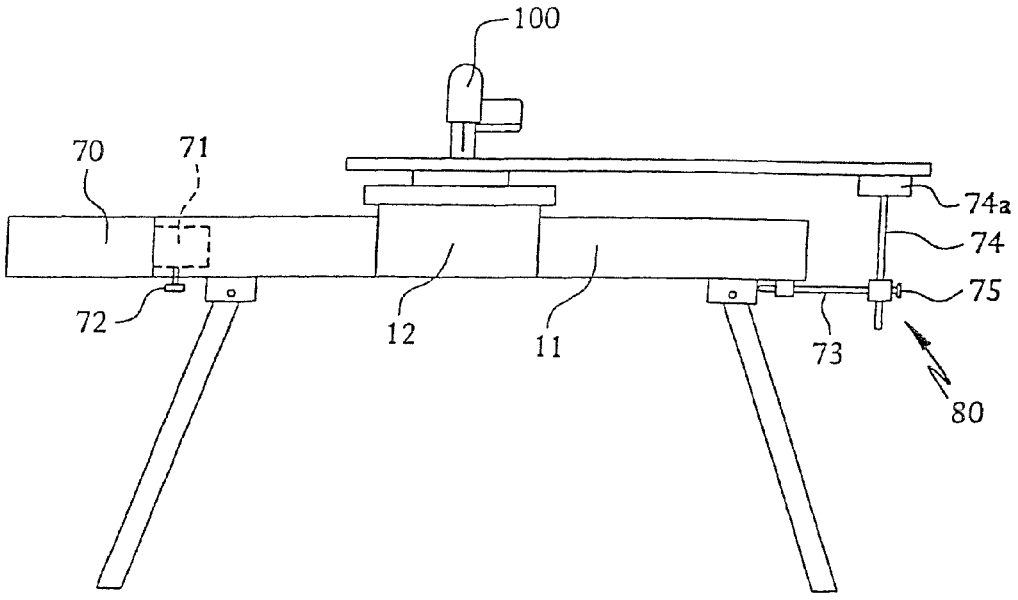

FIG. 9

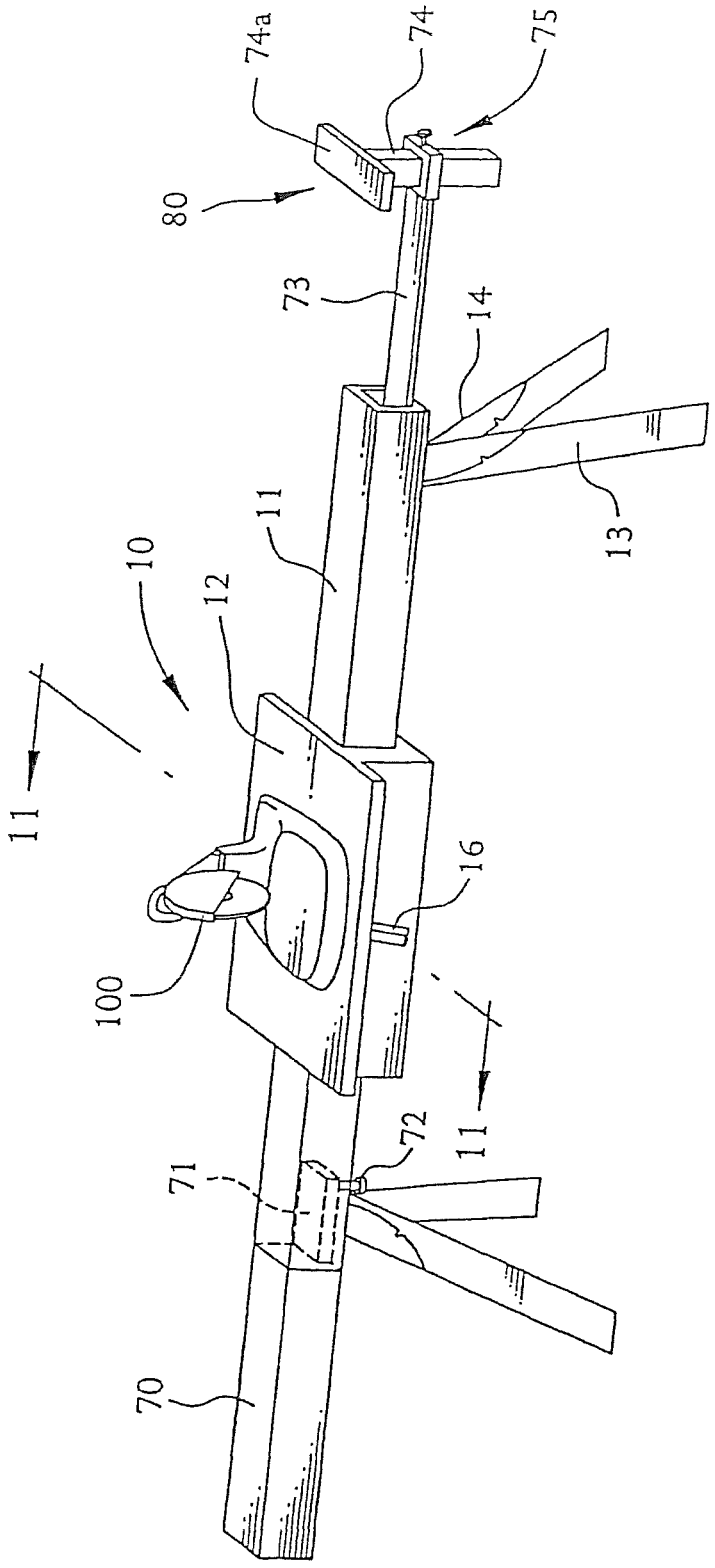

FIG. 10

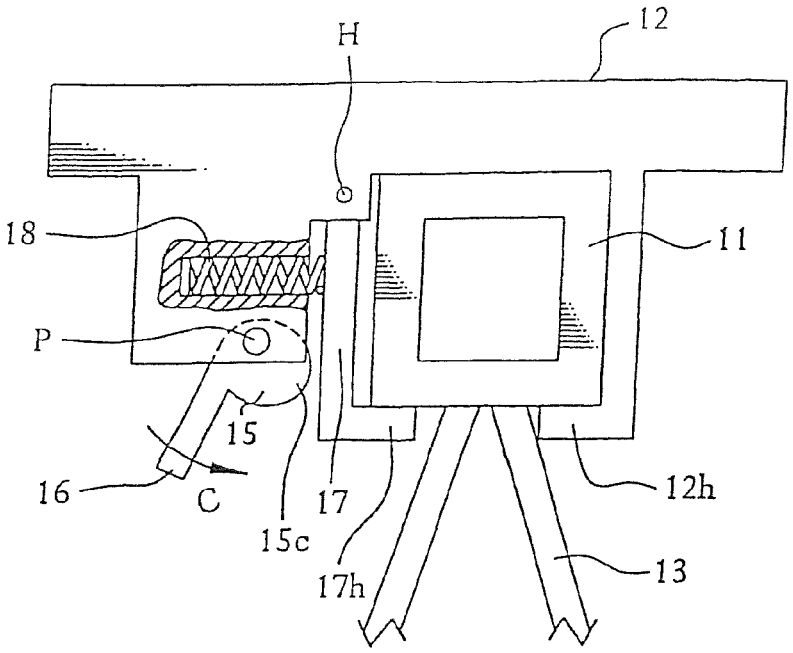

FIG. 11

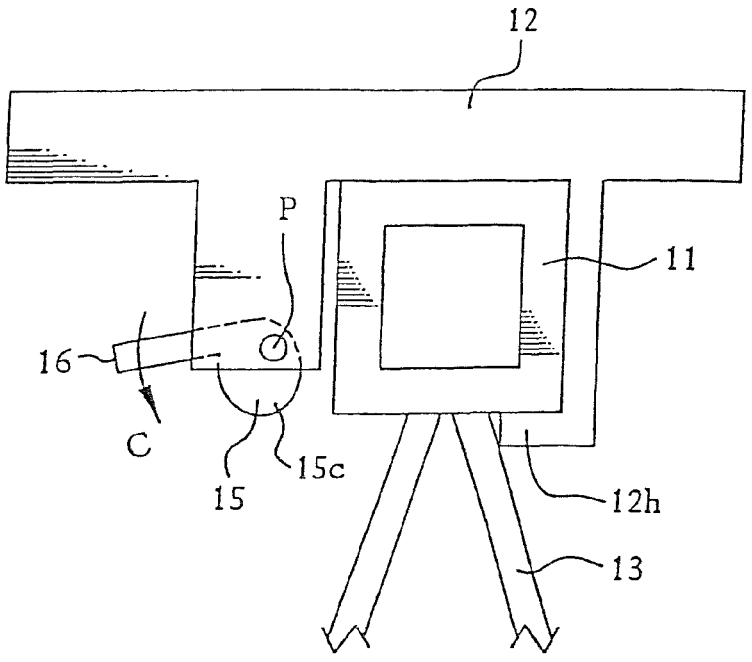

FIG. 12

PORTABLE WORK BENCH

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. patent application Ser. No. 12/883,642, filed Sep. 16, 2010, now U.S. Pat. No. 8,167,011, which is a continuation of U.S. patent application Ser No. 12/416,372, filed Apr. 21, 2009, now U.S. Pat. No. 7,814,947, which is in turn a continuation of U.S. patent application Ser. No. 11/376,963, filed Mar. 16, 2006, now U.S. Pat. No. 7,530,377, which is in turn a continuation of U.S. patent application Ser. No. 10/835,813, filed Apr. 30, 2004, now U.S. Pat. No. 7,048,021, which is in turn a continuation of U.S. patent application Ser. No. 10/449,270, filed May 30, 2003, now U.S. Pat. No. 6,748,987, which is in turn a continuation of U.S. patent application Ser. No. 10/151,507, filed May 20, 2002, now U.S. Pat. No. 6,595,251, which is in turn a continuation of U.S. patent application Ser. No. 09/760,386, filed Jan. 12, 2001, now U.S. Pat. No. 6,415,831, which in turn is a continuation of U.S. patent application Ser No. 09/357,500, filed Jul. 20, 1999, now U.S. Pat. No. 6,199,608, which is in turn a continuation of U.S. patent application Ser. No. 09/207,355, filed on Dec. 8, 1998, now U.S. Pat. No. 5,988,243, which in turn is a continuation-in-part of U.S. patent application Ser. No. 08/899,937, filed on Jul. 24, 1997, now U.S. Pat. No. 5,875,828. application Ser. No. 09/207,355 also derives priority from U.S. Application No. 60/070,501, filed Jan. 6, 1998, now abandoned.

FIELD OF THE INVENTION

This invention relates generally to work benches and more particularly to a portable work bench that can support a power tool and a workpiece.

BACKGROUND OF THE INVENTION

It is common in the construction industry for users to bring their power tools to the work site. Thus, the users require a work surface at the work site to support the power tools for use. Preferably the work surface is at a certain height so that the user can comfortably use the power tool. In addition, the work surface should also be sufficiently portable to be easily moved around a work site.

In the past, users have disposed their power tools on sheets of wood which are in turn supported by two or more sawhorses. This arrangement, however, lacks the strength for efficient operation, as well as being difficult to move around the work site.

Accordingly, different support stands or work benches have been proposed in order to provide a portable work surface that can support a power tool. Some of these prior art solutions have been described in U.S. Pat. Nos. 1,864,840, 4860,807, 4,874,025, 4,974,651, 5,193,598, and 5,421,231. However, these prior art solutions do not provide a platform supporting the power tool which can be moved horizontally so that the power tool can be moved without moving the workpiece.

Other prior art solutions, such as the one described in U.S. Pat. No. 5,592,981, provide a platform supporting the power tool which can be moved horizontally so that the power tool can be moved without moving the workpiece. However, they require that the user insert and slide the platform from the end of the workbench towards the desired position on the workbench.

SUMMARY OF THE INVENTION

In accordance with the present invention, an improved portable work bench is employed. The portable work bench includes a structural body, and a platform disposed on and frictionally contacting the structural body. In addition, the platform includes an override mechanism for allowing horizontal movement of the platform along the structural body. Further, the portable work bench may include a plurality of legs for supporting the structural body. The structural body may be tubular and preferably has a trapezoidal cross-section.

Such work bench can be used by disposing the platform on the structural body, so that the platform frictionally contacts the structural body. Then the user can mechanically override the static friction between the platform and the structural body and move the platform horizontally along the structural body.

Another embodiment of the present invention discloses a portable work bench, which includes a structural body, and a platform disposed on the structural body. In addition, the platform includes a cam mechanism for locking the position of the platform along the structural body. Further, the portable work bench may include a plurality of legs for supporting the structural body. The structural body may be tubular and preferably has a square cross-section.

Additional features and benefits of the present invention are described, and will be apparent from, the accompanying drawings and the detailed description below.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings illustrate preferred embodiments of the invention according to the practical application of the principles thereof, and in which:

FIG. **1** is a perspective view of a first embodiment of a portable work bench of the present invention;

FIG. **2** is a cross-sectional side view of the work bench along line **2-2** of FIG. **1**;

FIGS. **3**A and **3**B are cross-sectional front views of the work bench along line **3-3** of FIG. **2**, showing a first override mechanism;

FIGS. **4**A and **4**B are detailed cross-sectional side views of the work bench along line **2-2** of FIG. **1**;

FIGS. **5**A and **5**B are cross-sectional front views of the work bench along line **3-3** of FIG. **2**, showing a second override mechanism;

FIGS. **6**A and **6**B are cross-sectional front views of the work bench along line **3-3** of FIG. **2**, showing a third override mechanism;

FIG. **7** is a perspective view of a second embodiment of a portable work bench of the present invention;

FIG. **8** is a cross-sectional side view of the work bench along line **8-8** of FIG. **7**;

FIG. **9** is a front view of the work bench of the present invention with additional attachments and extensions;

FIG. **10** is a perspective view of a portable work bench of the present invention;

FIG. **11** is a cross-sectional side view of a first embodiment of the work bench along plane II-II-II of FIG. **10**; and

FIG. **12** is a cross-sectional side view of a second embodiment of the work bench along plane II-II-II of FIG. **10**.

DETAILED DESCRIPTION

The invention is now described with reference to the accompanying figures, wherein like numerals designate like parts. Referring to FIG. **1**, a portable work bench **10** of the

present invention is shown carrying a chop saw **100**. However, persons skilled in the art will recognize that the work bench **10** can support any power tool, such as a sliding compound miter saw, a drill press, a table saw, etc., any hand tools, or anything else that needs to be supported.

The work bench **10** has a structural body **11** and a platform **12** disposed on and frictionally contacting the structural body **11**. In addition, the work bench **10** may have legs **13** for supporting the structural body **11** and platform **12**. The legs **13** may be connected to the body **11** via brackets **14** as is well known in the art. Persons skilled in the art are referred to U.S. Pat. Nos. 4,605,099 and 5,592,981, which disclose exemplary means for providing foldable legs for the work bench. However, persons skilled in the art will know that fixed legs which do not fold will also function properly.

Referring to FIG. **2**, the structural body **11** is preferably tubular so that it can withstand substantial amounts of torsional and lateral loads applied thereto. Furthermore, the cross-section of the structural body **11** is preferably trapezoidal, that is, the top **11***t* and bottom **11***b* surfaces of the body **11** are parallel to each other. The side surfaces **11***s* can be parallel to each other, but are not required to. Preferably, the side surfaces **11***s* are angled in relation to the top **11***t* and bottom **11***b* surfaces. One side surface may be at an angle A relative to the top **11***t* and bottom **11***b* surfaces, while the other side surface may be at an angle B relative to the relative to the top **11***t* and bottom **11***b* surfaces. Preferably both angles A and B are equal and could be between 0° and 15°, where the preferred range is 3° to 4°.

The platform **12** is preferably designed to receive a power tool **100** thereon in the manner well known in the art. As mentioned above, the platform **12** is disposed on and frictionally contacts the structural body **11**. As seen in FIG. **2**, the side surfaces **12***s* of the platform **12** contact the side surfaces **11***s* of the body **11**. Once the power tool **100** is placed on the platform **12**, the frictional contact will hold the platform **12** on the body **11**, as well as maintain the location of the platform **12** along the body **11**. In other words, because of the frictional contact between the platform **12** and the body **11**, a user may not be able to easily move the platform **12** along the body **11**. In addition, if the body **11** has a trapezoidal cross-section, the platform **12** may stay on the body **11** when a sideways force F is applied on the platform, without requiring a separate lock assembly to hold the platform in place.

It is also preferable to provide respective flat foot portions **12***f* on the platform side surfaces **12***s*. This enables a user to lift up the platform **12** and use the platform on a table or other flat surface, if desired.

The platform **12** may also have an override mechanism **20**. This override mechanism **20** allows the user to move the platform **12** along the length of the structural body **11**. FIGS. **3**, **4**, **5**, and **6** show different override mechanisms to accomplish this purpose. All of these override mechanisms lift the platform **12** so that the platform side surfaces **12***s* do not contact the body side surfaces **11***s*. Because the frictional contact is reduced, the user can then roll or slide the platform to the desired position using less force than before.

Referring to FIGS. **3** and **4**, a carriage **23** is disposed under the platform **12**. The carriage **23** may have rollers **24** rotatably attached thereto. Persons skilled in the art will realize that other friction reducing mechanisms, such as ball bearings, may be used instead. As seen in FIGS. **3**A and **4**A, the rollers **24** do not touch the structural body **11**. Furthermore, the carriage **23** is preferably connected to the platform **12** via springs **31**, which pull the carriage **24** towards the platform **12**.

A threaded shaft **28** is threadedly engaged to the platform **12**. The shaft **28** may in turn have a pad **30**, which contacts the carriage **23**. Further, the shaft **28** may have a pinion **29**, which in turn engage the rack **33** of rod **27**.

The override mechanism **20** may have a lever **21** pivotally attached to both the platform **12** (via pin **25**) and to the rod **27** (via pin **26**). Accordingly, when the user moves the lever **21** in a clockwise direction X, the lever **21** pivots about pin **25**, pulling rod **27**. As the rod **27** is pulled, the rack **33** and pinion **29** combination cause the shaft **28** to rotate. As the shaft **28** rotates, it screws out of platform **12**, pushing carriage **23** downward. As the carriage **23** moves downward, the rollers **24** contact the structural body **11**. Then the platform **12** begins to rise along direction Y, until a gap is created between the platform side surfaces **12***s* and the structural body side surfaces **11***s* (see FIG. **4**B).

Because the platform side surfaces **12***s* and the structural body side surfaces **11***s* do not contact each other, no friction exists between them. A user can then easily move the platform **12** along the structural body **11** by pushing the platform **12**. Because the rollers **24** contact the structural body **11**, less force is required to move the platform **12** than before, as the coefficient for rolling friction is smaller than the coefficient for sliding friction.

Once the platform **12** has been moved to the appropriate location, the user can rotate the lever **21** in a counterclockwise direction. This causes the carriage **23** to return to the original, retracted position, in turn lowering the platform **12** until the platform side surfaces **12***s* and the structural body side surfaces **11***s* contact each other.

In order to ensure that the carriage **23** does not move sideways or rotate when the lever **21** is rotated, it is preferable to slidably dispose the carriage **23** on rods **41**, which are fixedly attached to the platform **12**. The rods **41** ensure that the carriage **23** only moves up and down.

A second embodiment of the override mechanism **20** is shown in FIG. **5**. As described above, the override mechanism **20** may preferably have a carriage **23** with rollers **24** rotatably attached thereto. In addition, the carriage **23** may be slidably disposed on rods **41**, which are fixedly attached to the platform **12**. In addition, springs **31** preferably bias the carriage **23** towards the platform **12**.

Unlike in the previous embodiment, cams **46** are used to move the carriage **23** downward. The cams **46** are pivotably attached to the platform **12** and rotate about pin **44**. The cams also have camming surfaces **45** and levers **43**. When the user pivots the cams **46** via the levers **43**, the camming surfaces **45** contact and urge the carriage **23** downwardly, so that the rollers **24** contact the structural body **11** and lift the platform **12** therefrom. In order to lower the platform **12**, the user need only to rotate the levers **46** in the opposite direction.

A third embodiment of the override mechanism **20** is shown in FIG. **6**. As described above, the override mechanism **20** may preferably have a carriage **23** carrying rollers **24** rotatably attached thereto. In addition, the carriage **23** may be slidably disposed on rods **41**, which are fixedly attached to the platform **12**. In addition, springs **31** preferably bias the carriage **23** towards the platform **12**.

Unlike in the previous embodiments, a rod **51** is rotated via knob **50** in order to move the carriage **23** along rods **41**. Rod **51** has a pinion **56** disposed thereon. Pinion **56** in turn meshes with a rack **55** provided on a shaft **53**. Once the knob **50** is rotated, the rack **55** and pinion **56** mesh, causing the shaft **53** to move downwardly. The shaft **53** then moves the carriage **23** downwardly. Preferably, a spacer **54** is provided in the platform **12** to ensure that the shaft **53** will only move vertically.

Further, it is also preferable to provide a spring **52** which biases the shaft **53** towards the platform **12**.

Referring to FIG. **7**, a second embodiment of the portable work bench is designated with reference numeral **10'**. Like the previous embodiment, work bench **10'** has a structural body **11** and a platform **12** disposed on and frictionally contacting the structural body **11**. In addition, the work bench **10** may have legs **13** for supporting the structural body **11** and platform **12**.

The platform **12** may also have an override mechanism, allowing the user to move the platform **12** along the length of the structural body **11**. FIGS. **7** and **8** show different aspects of another override mechanism used to accomplish this purpose. Preferably, the structural body **11** has a rack **61** along its entire length. The platform **12**, in turn, has a crank wheel **62**, connected to a rod **63**. Rod **63** has a pinion **64** disposed thereon. Pinion **64** meshes with the rack **61**. The platform **12** may also have rollers **24** disposed thereon.

By turning the knob **50**, the pinion **64** rotates, meshing with the rack **61**, thus overriding the static friction between the platform **12** and the structural body **11** and moving the platform **12** along the length of the structural body **11**. Persons skilled in the art may recognize that a proper ratio between the pinion and rack teeth can be selected in order to produce a mechanical advantage to help the user to move the platform **12** along the length of the structural body **11**.

Persons skilled in the art should also recognize that a lock mechanism can be provided to lock the crank wheel in order to prevent unintended movement of the platform **12**. Such persons will recognize that exemplary crank wheel lock mechanisms exists, for example, in the table saw field.

In addition, persons skilled in the art will recognize that extensions can be added to the portable work bench as is well known in the art. Referring to FIG. **9**, extension **70** can be inserted into the structural body **11** in order to increase its length, allowing the user to move the platform **12** along a greater length. Preferably, extension **70** has the same cross-section as the structural body **11**. Extension **70** preferably has a fixed inner joint **71**, which can be inserted into the structural body **11**. The joint **71** can then be secured by means of a screw or pin assembly **72**.

A workpiece support mechanism **80** can also be used on the work bench. This mechanism can support an elongated workpiece, such as moldings, etc., so that the user can cut it accurately.

The support mechanism **80** has a bar **73**, which is slidably attached to the structural body **11**. A clamp assembly **75** is disposed at the end of bar **73**. The clamp assembly **75** slidably receives and clamps a bar **74**. A support end **74***a* is in turn disposed at the end of bar **74**. Accordingly, a user can adjust the bar **74** and support end **74***a*, and then adjust the bar **73** so that the workpiece is properly supported.

FIGS. **10-12** show another embodiment of the present invention, wherein like numerals designate like parts. As before, the structural body **11** is preferably tubular so that it can withstand substantial amounts of torsional and lateral loads applied thereto. Furthermore, the cross-section of the structural body **11** is preferably square.

The platform **12** is preferably designed to receive a power tool **100** thereon in the manner well known in the art. As mentioned above, the platform **12** is disposed on the structural body **11**. As seen in FIG. **11**, the platform **12** may contacts the top and rear surfaces of the body **11**. Platform **12** may also contact the bottom surface of the body **11** via a hook portion **12***h*.

Platform **12** may also have a cam **15** pivotally attached thereto and pivotable about axis P. A handle **16** is connected to cam **15** so that, upon movement of handle **16**, cam **15** moves.

In addition, platform **12** may have a locking plate **17** pivotally attached thereto and pivotable about axis H. Locking plate **17** may pivot between a first position contacting the structural body **11** and a second position not contacting the structural body **11**. A spring **18** may be connected between locking plate **17** and platform **12** to bias locking plate **17** towards the second position.

In order to lock platform **12** on the desired position along structural body **11**, the user need only move handle **16** along direction C. This will cause cam **15** to rotate and bring cam portion **15***c* against locking plate **17**. As cam **15** is rotated, the locking plate **17** is moved further towards the first position until it contacts structural body **11**. Locking plate **17** may have a hook portion **17***h* to further contact the structural body **11** when in the first position. To unlock platform **12**, the user need only move handle **16** in the opposite direction.

Persons skilled in the art will recognize that the same result, i.e., locking platform **12** on a desired position along structural body **11**, may be achieved without locking plate **17** and spring **18**, as shown in FIG. **3**. Instead, cam **15** will contact structural body directly.

Persons skilled in the art may recognize other additions or alternatives to the means disclosed herein. However, all these additions and/or alterations are considered to be equivalents of the present invention.

What is claimed is:

1. A portable workbench comprising:
- a tubular structural body having a longitudinal axis and having a width and a length longer than the width;
- a plurality of legs supporting the structural body
- a platform disposed on the structural body and contacting the structural body on at least two sides; and
- a locking mechanism disposed on the platform for fixing the position of the platform relative to the structural body, said locking mechanism comprising an eccentric cam rotatable about a first axis between a first position locking the platform on the structural body and a second position unlocking the platform.

2. The work bench of claim **1**, wherein the structural body has a trapezoidal crosssection.

3. The work bench of claim **1**, wherein the platform further comprises a top surface, upon which a power tool can be installed thereon.

4. The work bench of claim **1**, wherein the platform further comprises side surfaces that frictionally contact the structural body.

5. The work bench of claim **4**, wherein the side surfaces end in respective flat foot portions.

6. The work bench of claim **1**, further comprising an extension that can be installed at an end of said structural body.

7. The work bench of claim **1**, further comprising a support mechanism installed at an end of said structural body for supporting an elongated work piece.

8. The work bench of claim **1**, wherein the structural body has a square cross-section.

9. The work bench of claim **1**, wherein the platform is movable along the structural body.

10. The work bench of claim **1**, wherein the first axis is substantially parallel to the longitudinal axis of the structural body.

11. The work bench of claim **1**, wherein the platform comprises a hook portion contacting the structural body.

12. The work bench of claim 1, wherein the locking mechanism further comprises a plate disposed between the cam and the other of the structural body and the platform.

13. The work bench of claim 12, wherein the locking mechanism further comprises a spring for biasing the plate towards the cam.

14. The work bench of claim 1, further comprising a handle connected to the cam for moving the cam between first and second positions.

15. The work bench of claim 1, wherein the first axis is substantially horizontal.

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